ENGINEERING STATEMENT RE:
REALLOCATION AND UPGRADE KUPN(TV) AND KUPN-DT
FROM STERLING, COLORADO
TO FORT MORGAN, COLORADO
CH. 3-NTSC, 100 KW ERP, 600 METERS AAT
CH. 23-DTV, 760 KW ERP, 2103 METERS AMSL

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Prepared by
Lohnes and Culver Washington, D.C.

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ENGINEERING STATEMENT RE:
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CH. 3-NTSC, 100 KW ERP, 600 METERS AAT
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INTRODUCTION

This engineering statement is prepared on behalf of Channel 20 TV Company, licensee of KUPN, "KUPN" (formerly KTVS) at Sterling Colorado. KUPN is licensed on NTCS Channel 3 and has been paired with DTV Channel 23. KUPN proposes to reallocate NTSC Channel 3 and DTV Channel 23 from Sterling to Fort Morgan, Colorado and to relocate its NTSC and DTV transmitter facilities approximately 108 km southeast. Sterling is presently alloted DTV Channel 23 and NTSC Channels 3 and 18*, the latter being a vacant allotment. Fort Morgan is presently without a television allotment. This statement contains technical information in support of the proposed change.

PROPOSED NTSC RELOCATION

The present KUPN Channel 3 facilities are 60.3 kW at 232 meters AAT. The proposed relocated facility will be 100 kW at 600 meters AAT. The relocated transmitter site is approximately 35 miles south of Fort Morgan and immediately to the southeast of Hoyt, Colorado.

ALLOCATION STUDY

The relocation of KUPN requires analysis under the NTSC allocation distance restrictions for Zone 2 Low-VHF channels. The relocation and reallocation is mutually exclusive with the present KTVS allocation at Sterling. The relocation creates one new short-spacing with the Co-channel operation of KREG-TV at Glenwood Springs, Colorado. The full allocation analysis is presented in Figure 1 attached to this statement. The NTSC Channel 3 relocation does not adversely impact any DTV allotment.

PRESENT AND PROPOSED SERVICE AREAS

Attached as Figure 2A is a map showing the present and proposed KUPN Service contours, including the City Grade contour showing service to the city of assignment. Shown on Figure 2B are the respective Grade B contours, illustrating present and proposed service. The population and area within those contours are shown in the tabulation of Figure 3. The Grade B land area nearly doubles to 195% of the present area. The population increases by a factor of 36.7 times the present population.

UNDERSERVED AREAS

Both the present and proposed KUPN Grade B contours encompass some areas with no other services (where KUPN provides the first service, traditionally called white area), and areas with one other service (where KUPN provides the second service, traditionally called gray area). The proposed facility will provide first television service to 40,860 people, an additional first service population of 34,250. It will provide a second service to 18,630 people, an additional second service population of 11,850 people. These areas are also tabulated on Figure 3 and are illustrated on the map attached as Figures 4A and 4B.

OTHER SERVICES

The extent of the other services areas, indicated by the contour areas outside of the first and second service areas, up to 5 other services, are shown on the maps of Figures 4A and 4B. Attached as Figures 5A and 5B are tabulations listing the other stations providing service to the present and proposed KUPN Grade B contours. Stations providing other service to the present KUPN Grade B contour loss area are listed first in table 5A. Stations providing other service to the remainder of the present Grade B contour are listed next.

In the case of the proposed KUPN Grade B contour, shown on Figures 4B and 5B, some stations provide other service and have transmitters located within the KUPN Grade B contour. That condition is noted on Figure 5B. Only full power Television and Class-A

Television licensed facilities were considered. Un-licensed and Low power and translator stations were excluded. Both educational and commercial facilities are tabulated and the educational stations are identified on the tabulations.

INTERFERENCE ANALYSIS

The relocated KUPN facility will be 296.45 km from KREG-TV at Glenwood Springs, Colorado, a short spacing of 8.45 km below the required 304.9 km spacing. KREG-TV is located west southwest of the proposed KUPN site. Between the two sites are three mountain ranges of the Rocky Mountains; the Front range, the Park range and the Sawatch range. The peaks of the several mountain ranges extend to more than 12,000 feet AMSL. The radio propagation path between the two sites passes over these several distinct mountain obstructions. This topography is illustrated on the two profile graphs attached to this statement. Figure 6A illustrates the path from the proposed KUPN to KREG-TV and Figure 6B shows the reverse path. Clearly, the two service areas are isolated by perhaps the longest path over very rugged topography in the United States. By any analysis, the intervening terrain severely limits service and interference signals.

To quantify the interference in this case, the methodology specified in the FCC Rules regarding DTV television, and detailed in FCC OET Bulletin 69, is used. That method employs a version of the Longley-Rice propagation model and certain analytical assumptions. It is used to calculate the impact of proposed DTV and NTSC facility changes. Its use for calculating NTSC to NTSC interference is available in the program and it is specified as the required DTV analysis in making DTV and NTSC change applications. Therefore, its use in this analysis is appropriate.

Attached as Figures 7A and 7B are two service analysis maps showing the predicted service from KREG-TV, including interference limitations, before and after the proposed KUPN relocation. The change of service resulting from this change is so slight, it is very difficult to see in Figures 7A and 7B. Therefore, maps showing the differential between the two predicted service showings are attached as Figures 7C and 7D. Figure 7C shows a scattering of 1 km square cells predicted to receive newly predicted interference as a result of the KUPN relocation. Those areas are scattered in the rugged terrain and ridge tops of the Rocky Mountains. The interference areas generally do not fall

on any communities and are mostly confined to relatively sparsely populated U.S. Forest areas. Figure 7D is the inverse of Map 7C. It shows the KREG-TV area that will no longer receive interference, the area that will gain service, as a result of the KUPN relocation. Figure 7E is a tabulation of the KREG-TV service predictions, before and after the proposed KUPN relocation. It includes the population and area within the predicted Grade B contour, which is limited by terrain and by interference from other stations. The proposed relocation is predicted to cause a net increase in interference, above the accepted 28 dB d/u ratio, to 643 people out of a total of 215,640 people in the KREG-TV Grade B contour. The predicted additional interference to KREG-TV amounts to far less than 1 percent of the KREG-TV predicted Grade B population and, therefore, represents a de minimus increase in interference.

CONCLUSION: KUPN NTSC RELOCATION

KUPN NTSC Channel 3 can be relocated and reallocated to Fort Morgan with a large increase in service area and population, bring a new first service to the community and surrounding area and with a minimum of predicted impact on the co-channel station KREG-TV. The proposed facility will provide first television service to 40,860 people, a net increase of 34,250, and second service to 18,630 people, an increase of 11,850 people.

PROPOSED DTV RELOCATION

The KUPN DTV facilities will also be relocated to Fort Morgan. The relocation exceeds that permitted for a "check list" change, therefore, a DTV analysis is presented below. The analysis presents the maximization ERP and antenna height consistent with the FCC required de minimus, 2% and 10% interference limits. The analysis is made using the methodology contained in the FCC DTV Rules and in FCC OET Bulletin 69.

PRESENT AND PROPOSED DTV SERVICE

Attached as Figure 8 is a DTV service contour map presenting the area of 48 dBu DTV service. The map shows present and proposed service over Sterling and Fort Morgan. Attached as Figures 9A through 9C are tables detailing the Appendix B allocation (before), and the proposed service and predicted interference (after) caused by the

change. The maximum new interference does not exceed 2% of population, and the total interference received by any protected station does not exceed 10% of population.

CONCLUSION: KUPN DTV RELOCATION

KUPN-DT Channel 23 can be maximized, relocated and reallocated to Fort Morgan with a large increase in service area and population, bring a new first DTV service to the community and surrounding area and with a minimum of predicted impact on other stations as required by the FCC Rules.

RESPECTFULLY SUBMITTED,
Lohnes and Culver

by; 
Robert D. Culver, P.E.
Md. Reg. No. 19672

May, 2002

FIGURE 1
NTSC ALLOCATION STUDY
KUPN(TV) CHANNEL 3 100 KW ERP
CHANNEL 20 TV COMPANY
FORT MORGAN, COLORADO

CHANNEL	CALL	CITY, STATE	DISTANCE SEPARATION IN KM ACTUAL[1]	REQUIRED[2]
2	KWGN-TV	Denver, CO.	110.15	95.7
3	KUPN(TV)	Sterling, CO.	108.43	304.9[3]
3	KREG-TV	Glenwood Springs, CO.	296.45	304.9[4]
3	KSWK	Lakin, KS.	340.43	304.9
4	KCNC-TV	Denver, CO.	109.98	95.7

Notes:
(1) Calculated separation as per Section 73.611.
(2) Required separation as per Section 73.610.
(3) Relocated KUPN mutually exclusive allocation.
(4) New short-spacing. See terrain shielding.

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Lohnes and Culver Washington, D.C.
May, 2002

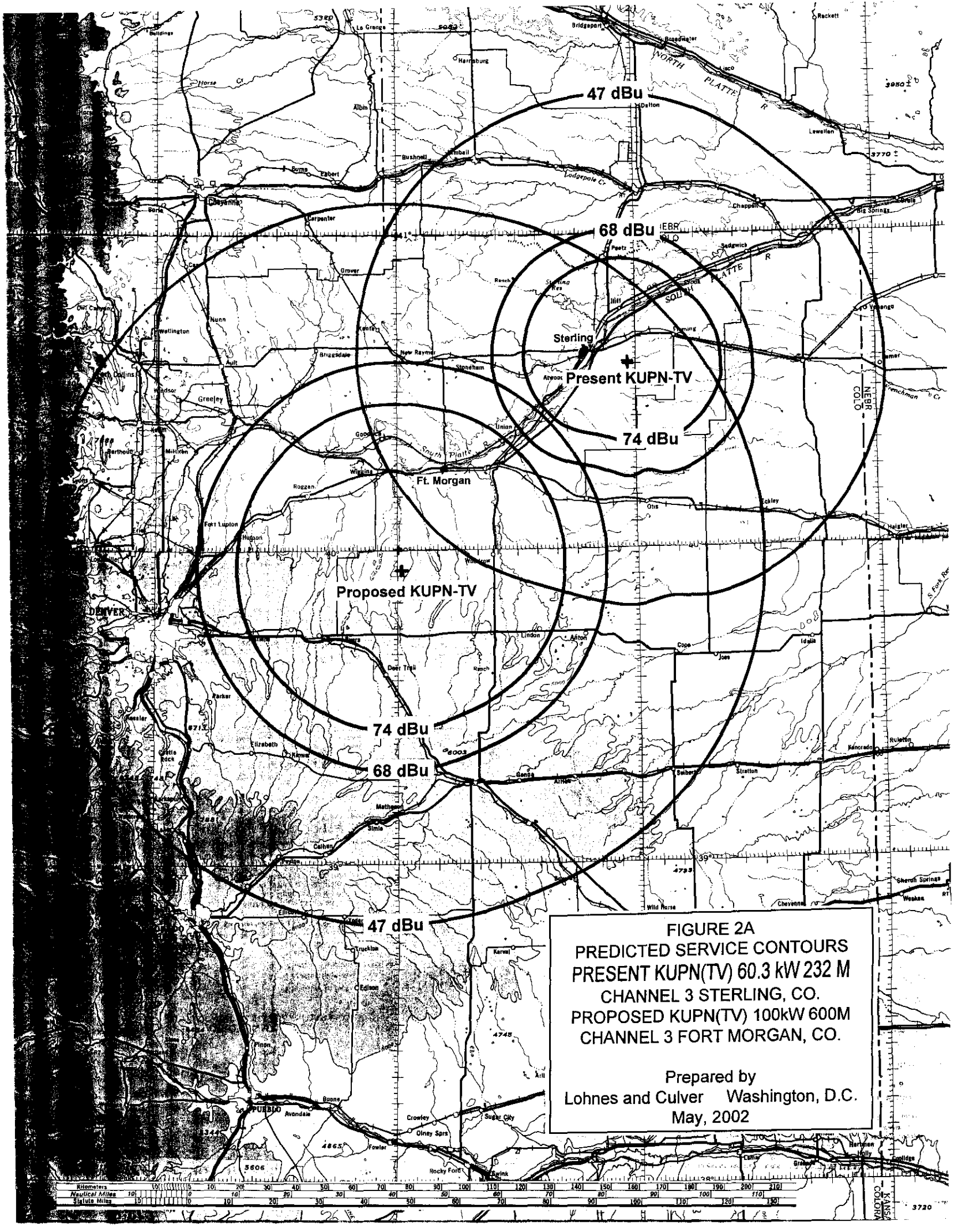

FIGURE 2A
PREDICTED SERVICE CONTOURS
PRESENT KUPN(TV) 60.3 kW 232 M
CHANNEL 3 STERLING, CO.
PROPOSED KUPN(TV) 100kW 600M
CHANNEL 3 FORT MORGAN, CO.

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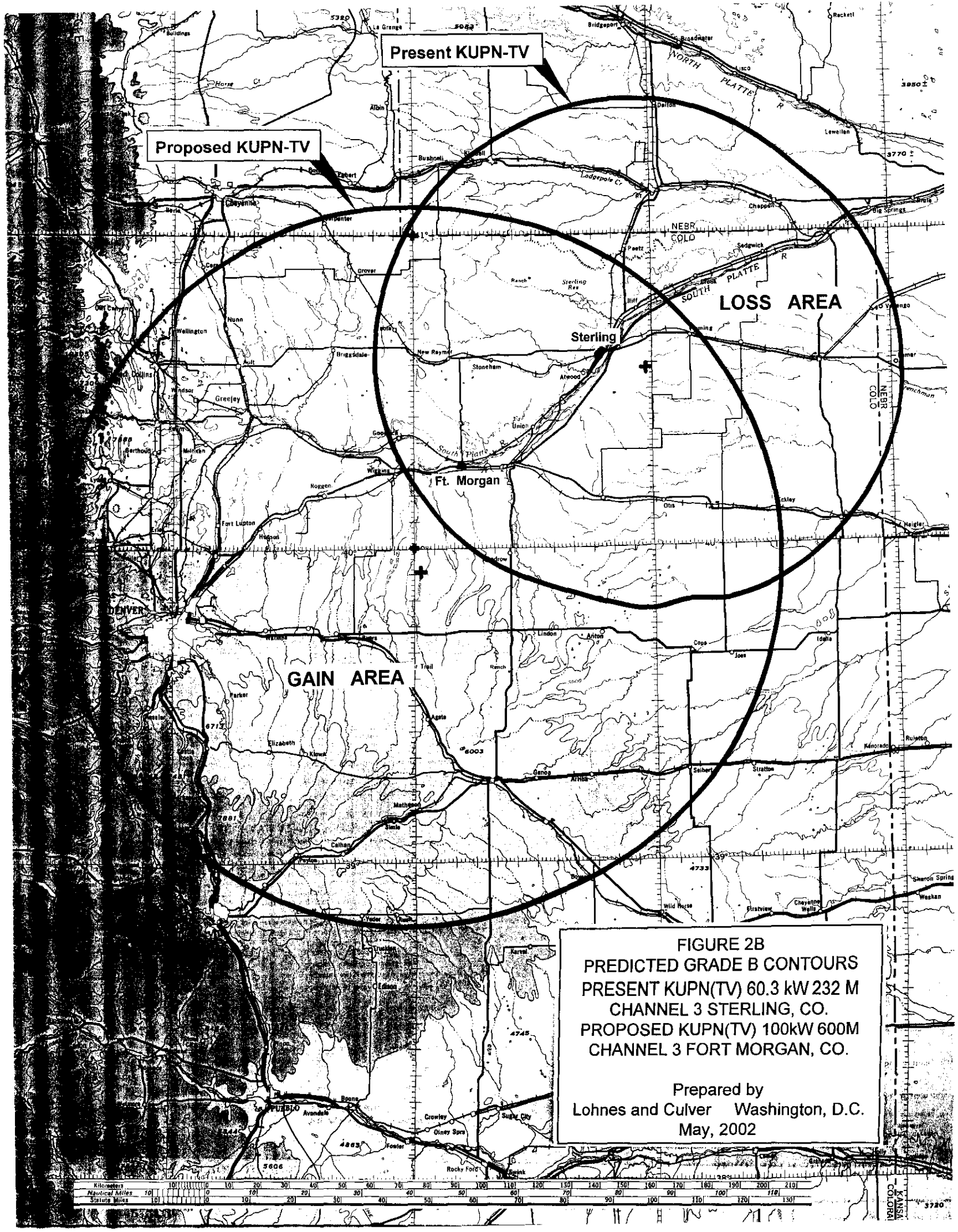

FIGURE 2B
PREDICTED GRADE B CONTOURS
PRESENT KUPN(TV) 60.3 kW 232 M
CHANNEL 3 STERLING, CO.
PROPOSED KUPN(TV) 100kW 600M
CHANNEL 3 FORT MORGAN, CO.

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FIGURE 3
GRADE B SERVICE AREAS
KUPN(TV) CHANNEL 3 100 KW ERP
CHANNEL 20 TV COMPANY
FORT MORGAN, COLORADO

CONTOUR	AREA SQ. KM	POPULATION 2000 PL94-171
Present Gr. B	26,460	80,800
Proposed Gr. B	51,530	2,962,800

CONTOUR	AREA SQ. KM	POPULATION 2000 PL94-171
Gr. B Gain	37,300	2,902,500
Gr. B Loss	11,690	26,800

CONTOUR AREA	POPULATION NO OTHER SERVICE	POPULATION ONE OTHER SERVICE
Present Gr. B Loss area	6,610	6,780
Proposed Gr. B Gain area	40,860	18,630

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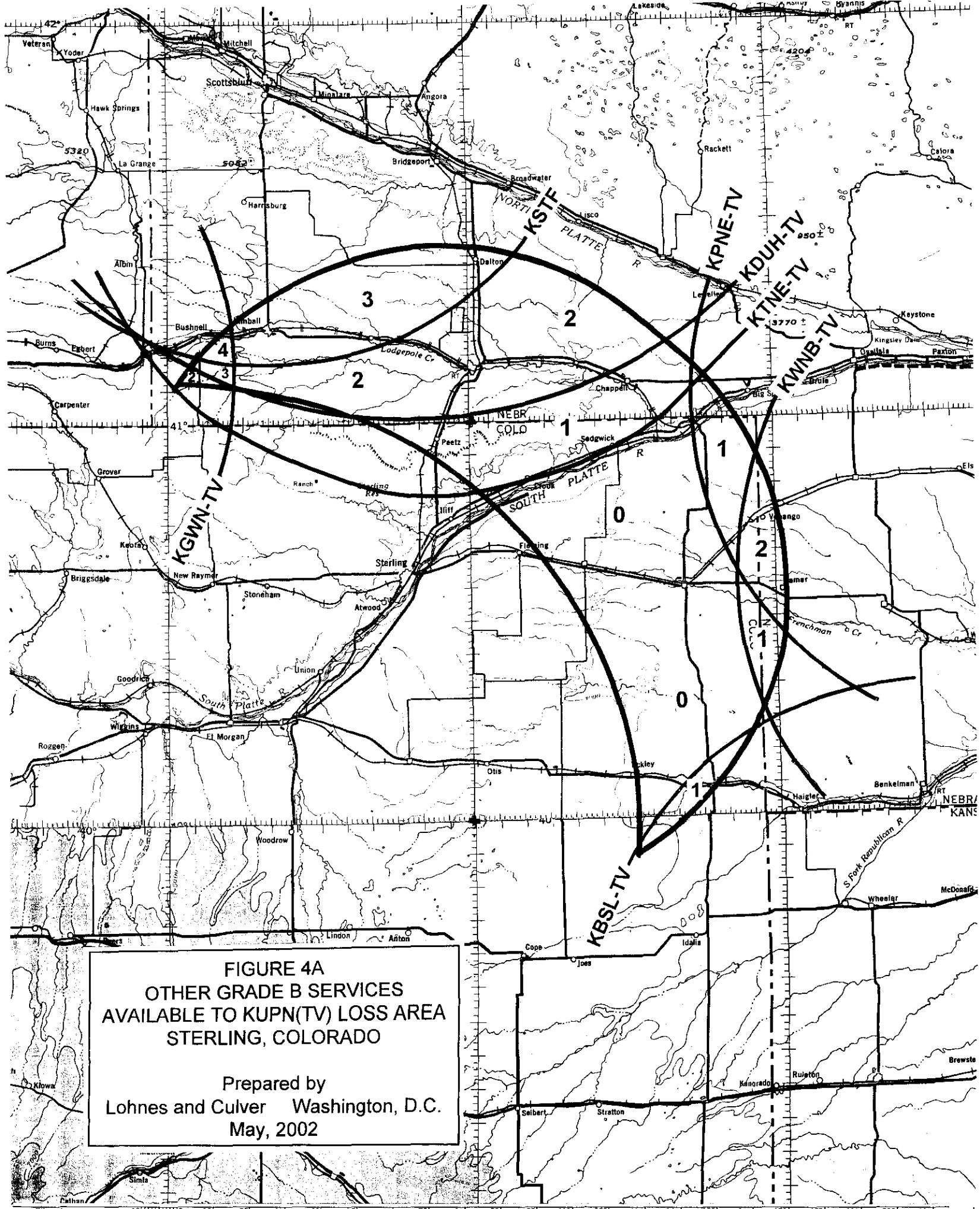

FIGURE 4A
OTHER GRADE B SERVICES
AVAILABLE TO KUPN(TV) LOSS AREA
STERLING, COLORADO

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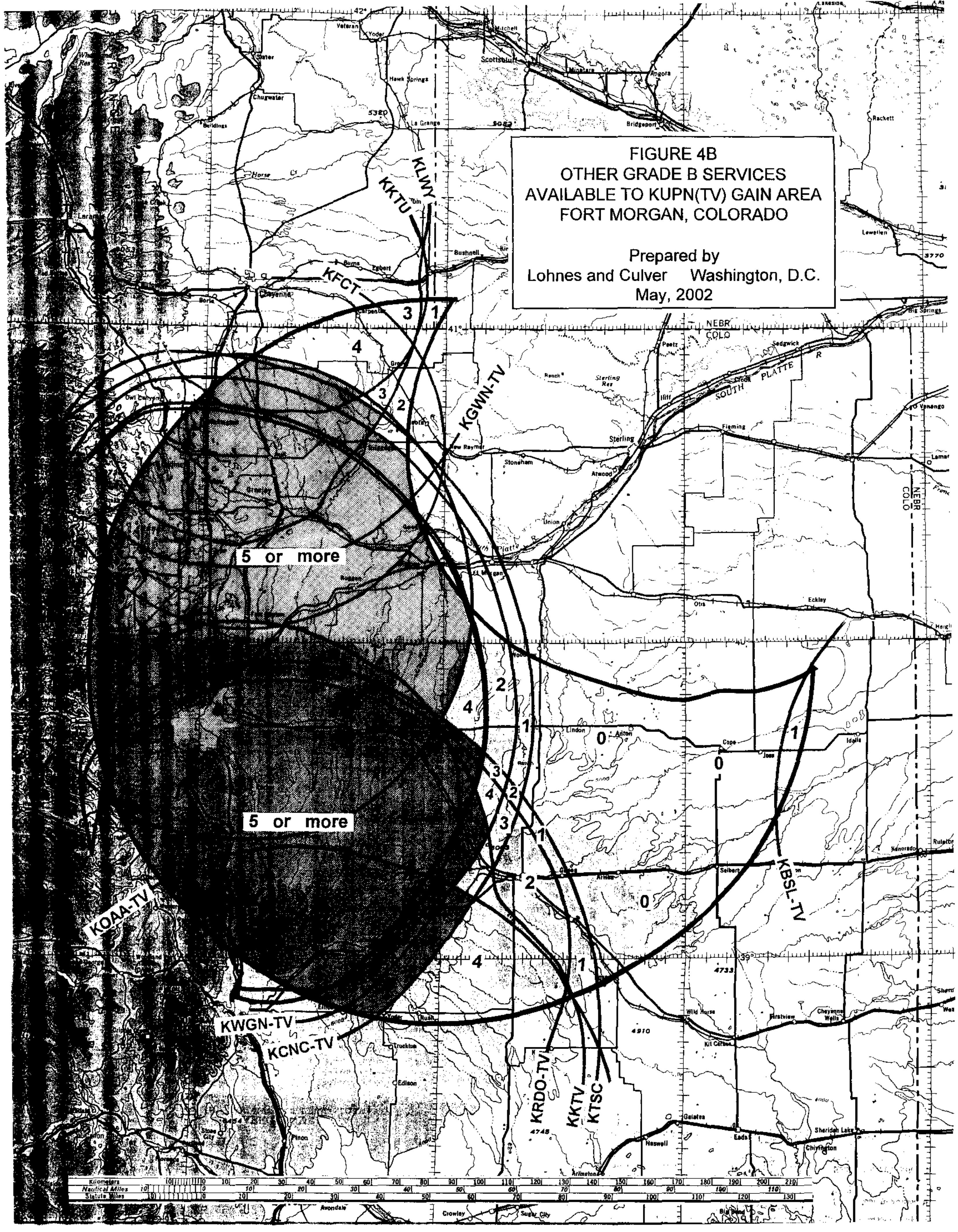
FIGURE 4B
OTHER GRADE B SERVICES
AVAILABLE TO KUPN(TV) GAIN AREA
FORT MORGAN, COLORADO
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KLWY
KKTU
KFCT
KGWN-TV
5 or more
5 or more
KOAA-TV
KWGN-TV
KCNC-TV
KRDO-TV
KKTV
KTSC
KBSL-TV
NEBR
COLO
Kilometers
Nautical Miles
Statute Miles

FIGURE 5A
OTHER GRADE B SERVICES
PRESENT KUPN LOSS AND OTHER AREA
KUPN(TV) CHANNEL 3 100 KW ERP
CHANNEL 20 TV COMPANY
FORT MORGAN, COLORADO

TRANSMITTER OUTSIDE PARTIAL SERVICE CONTOUR OVERLAP

CALL	CHANNEL	ERP KW / HAAT METERS	CITY/STATE
LOSS AREA			
KGWN-TV	5	100 / 192	Cheyenne, Wyoming
KDUH-TV	4	100 / 613	Scotts Bluff, Nebraska
KSTF	10	240 / 264	Scotts Bluff, Nebraska
KTNE-TV	13*	316 / 472	Alliance, Nebraska
KPNE-TV	9*	316 / 314	North Platte, Nebraska
KWNB-TV	6	100 / 224	Hayes Center, Kansas
KBSL-TV	10	316 / 283	Goodland, Kansas
OTHER AREA			
KFCT	22	1860 / 255	Fort Collins, Colorado
KMGH-TV	7	316 / 320	Denver, Colorado
KRMA-TV	6*	100 / 294	Denver, Colorado
KCNC-TV	4	100 / 451	Denver, Colorado
KWGN	2	100 / 319	Denver, Colorado
KRDO-TV	13	282 / 652	Colorado Springs, Colorado

*Educational reserved station

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Lohnes and Culver Washington, D.C.
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FIGURE 5B
OTHER SERVICES PROPOSED KUPN
KUPN(TV) CHANNEL 3 100 KW ERP
CHANNEL 20 TV COMPANY
FORT MORGAN, COLORADO

Transmitter site inside KUPN Grade B contour

CALL	CHANNEL	LOCATION	CALL	CHANNEL	LOCATION
KWHD	53	Castle Rock, CO.	KCEC	50	Denver, CO.
KDEN	25	Longmont, CO.	KMGH-TV	7	Denver, CO.
KFCT	22	Fort Collins.CO.	KDVR	31	Denver, CO.
KCNC-TV	4	Denver, CO.	KTVD	20	Denver, CO.
KPXC-TV	59	Denver, CO.	KRMA-TV	6*	Denver, CO.
KUSA-TV	9	Denver, CO.	KRMT	41*	Denver, CO.
KWGN-TV	2	Denver, CO.			

Transmitter outside service contour partial overlap

CALL	CHANNEL	LOCATION	CALL	CHANNEL	LOCATION
KBDI-TV	12*	Broomfield, CO.	KGWN-TV	5	Cheyenne, WY.
KLWY	27	Cheyenne, WY.	KKTU	33	Cheyenne, WY,
KRDO-TV	13	Colorado Springs, CO.	KOAA-TV	5	Pueblo, CO.
KTSC	8*	Pueblo, CO.	KBLS-TV	10	Goodland, KS.
KXRM-TV	21	Colorado Springs, CO.	KTNE-TV	13*	Alliance, NE.
KKTV	11	Colorado Springs, CO.			

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Lohnes and Culver Washington, D.C.
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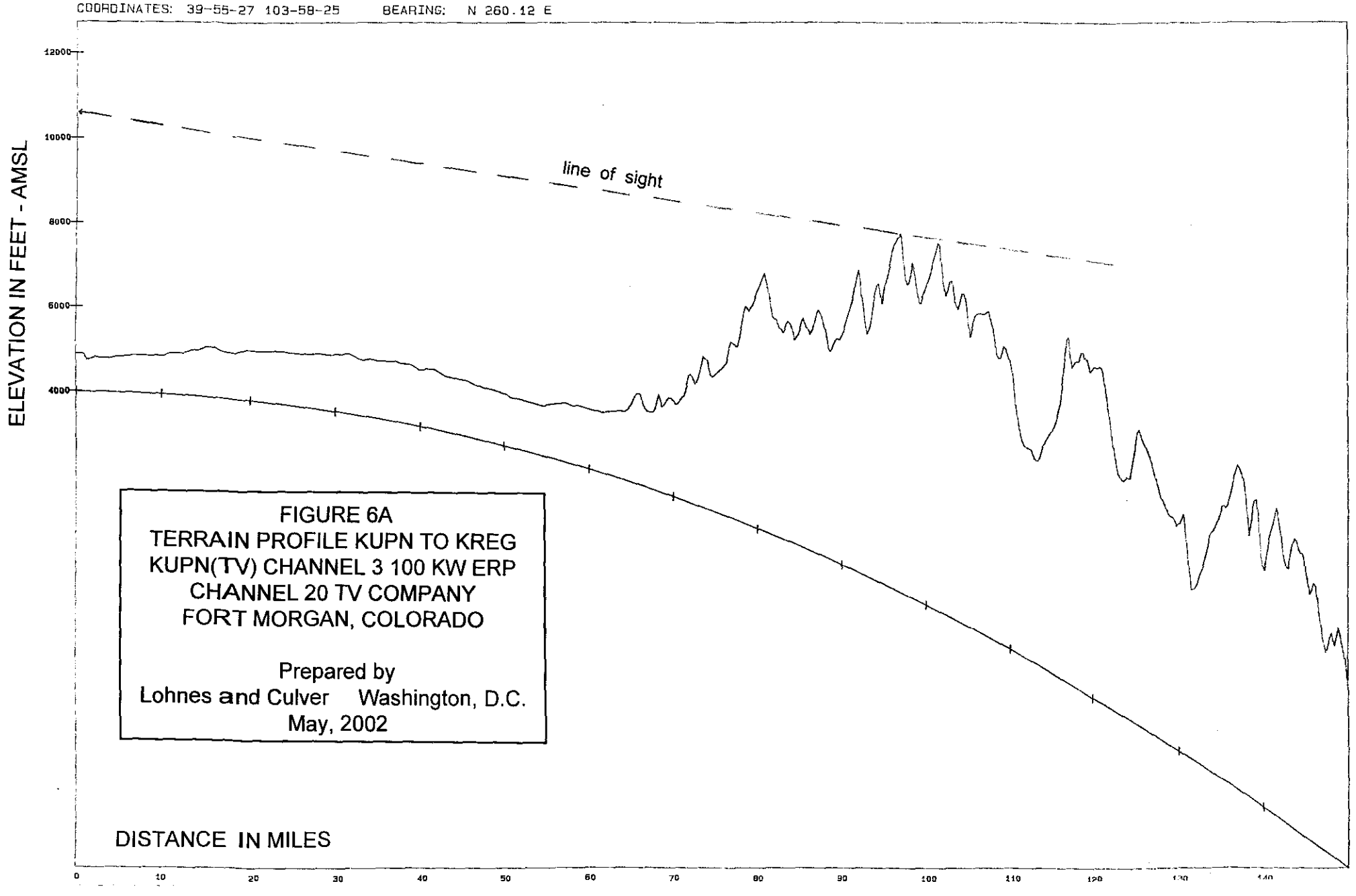

FIGURE 6A
TERRAIN PROFILE KUPN TO KREG
KUPN(TV) CHANNEL 3 100 KW ERP
CHANNEL 20 TV COMPANY
FORT MORGAN, COLORADO

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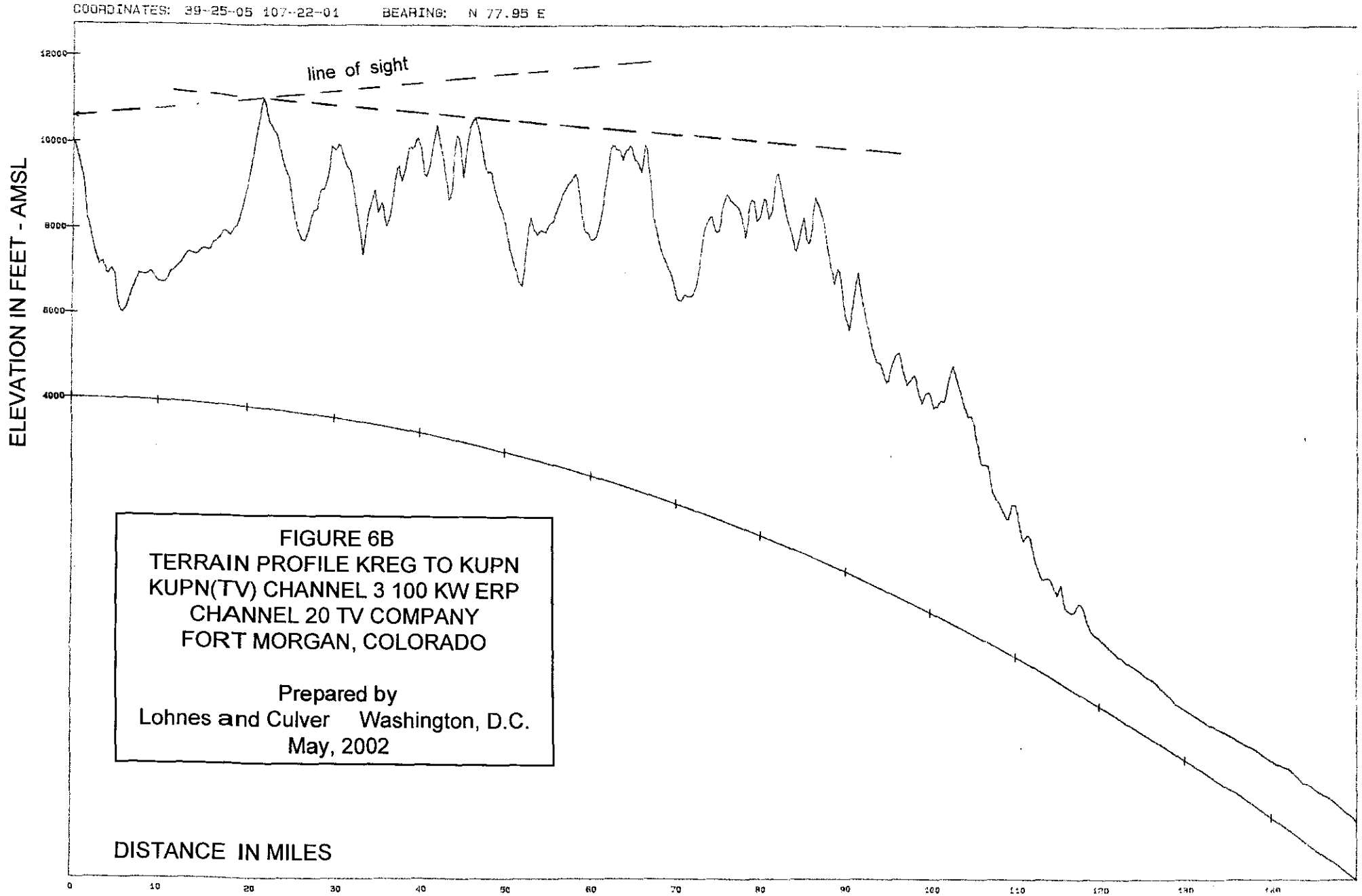

FIGURE 6B
TERRAIN PROFILE KREG TO KUPN
KUPN(TV) CHANNEL 3 100 KW ERP
CHANNEL 20 TV COMPANY
FORT MORGAN, COLORADO

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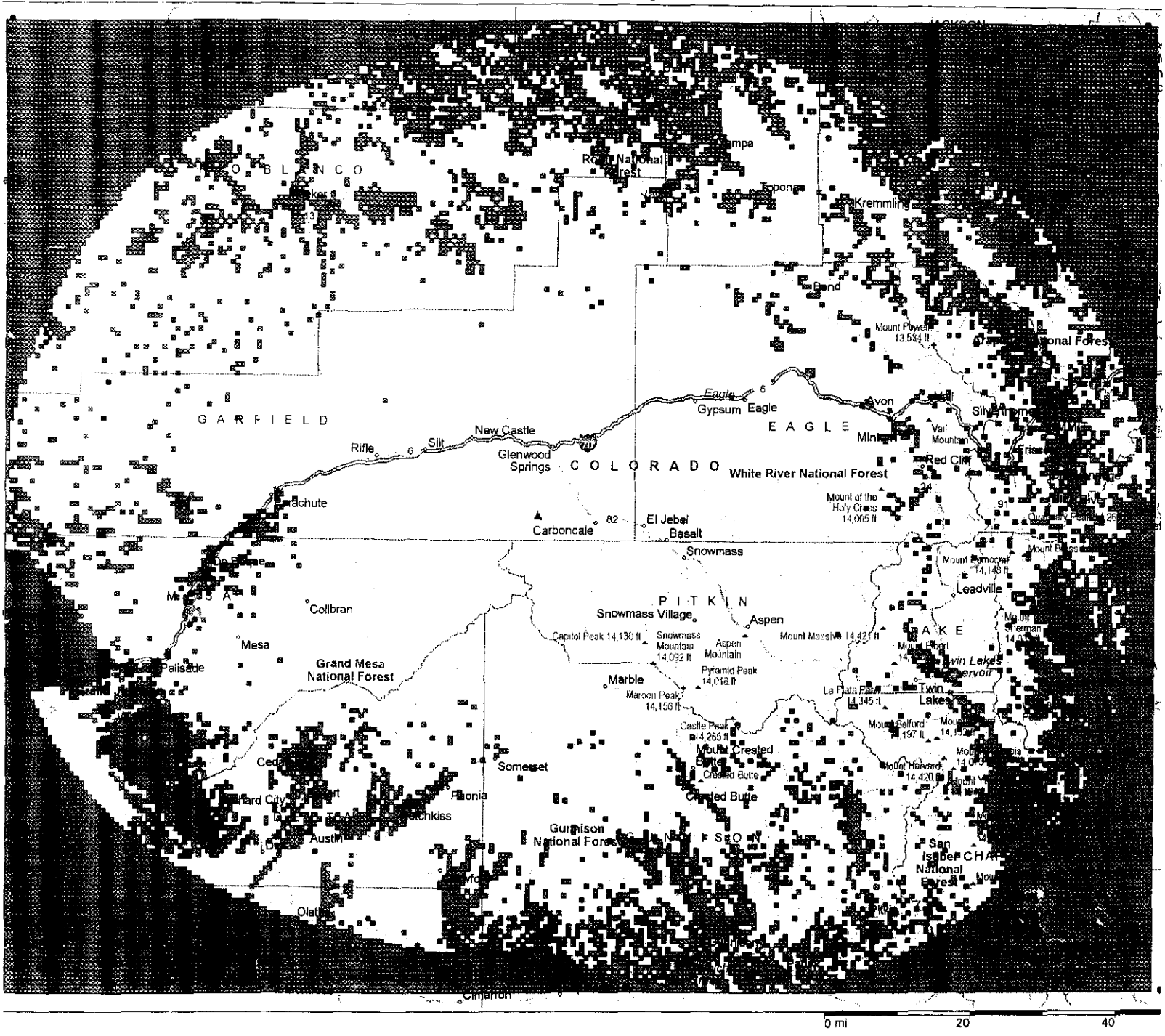
Glenwood Springs



NOTE: 1 km square cells-marker indicate no service.

FIGURE 7A
KREG LONGLEY RICE SERVICE/KUPN PRESENT
KUPN(TV) CHANNEL 3 100 KW ERP
CHANNEL 20 TV COMPANY
FORT MORGAN, COLORADO

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Lohnes and Culver Washington, D.C.
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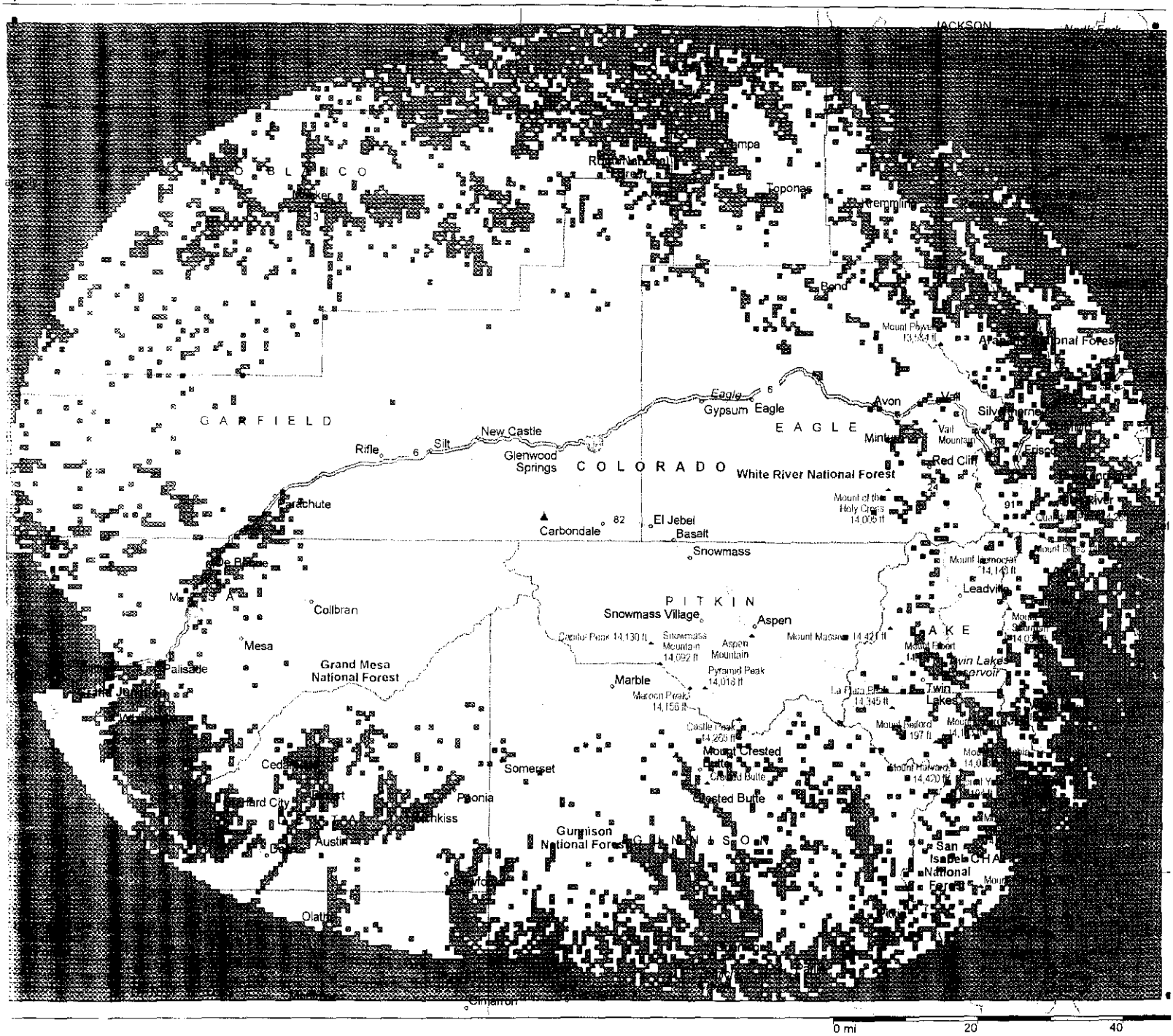

NOTE: 1 km square cells-marker indicate no service.

FIGURE 7B
KREG LONGLEY RICE SERVICE/KUPN PROPOSED
KUPN(TV) CHANNEL 3 100 KW ERP
CHANNEL 20 TV COMPANY
FORT MORGAN, COLORADO

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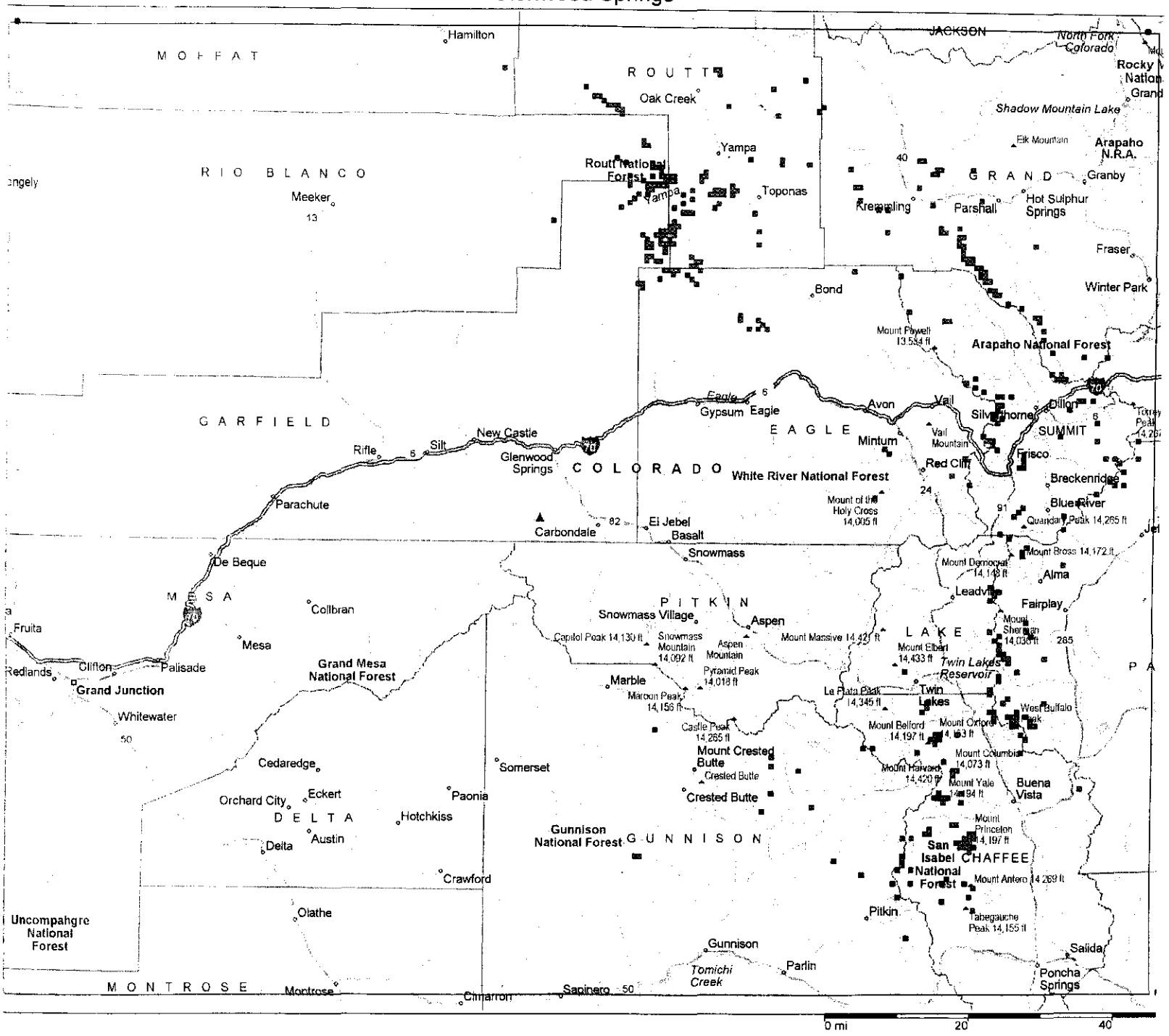

NOTE: 1 km square cells-marker indicate changed service.

FIGURE 7C
KREG NEW INTERFERENCE AREA
KUPN(TV) CHANNEL 3 100 KW ERP
CHANNEL 20 TV COMPANY
FORT MORGAN, COLORADO

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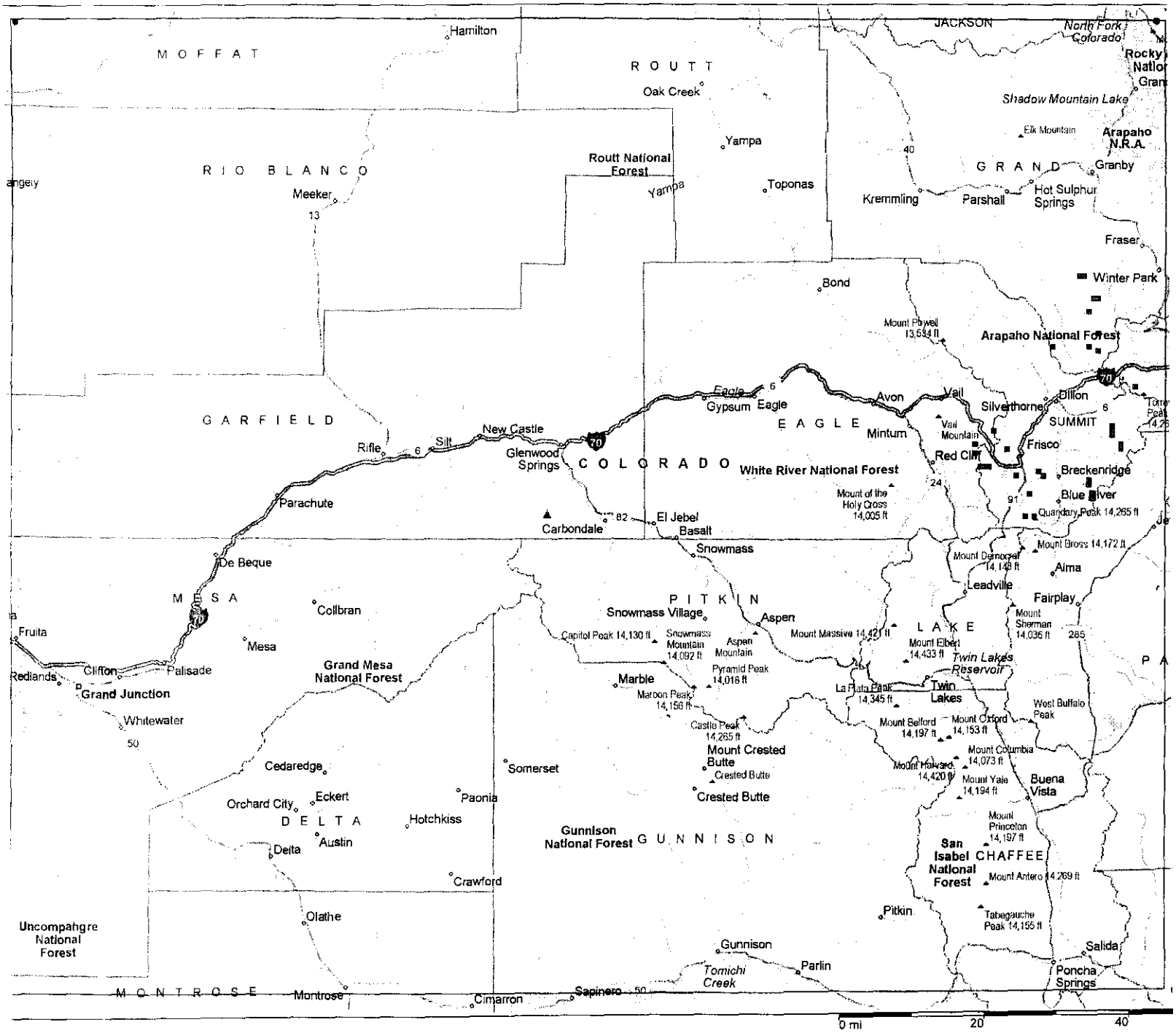
May, 2002

Glenwood Springs



NOTE: 1 km square cells-marker indicate changed service.

FIGURE 7D
KREG NEW SERVICE AREA
KUPN(TV) CHANNEL 3 100 KW ERP
CHANNEL 20 TV COMPANY
FORT MORGAN, COLORADO

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FIGURE 7E
KUPN(TV) INTERFERENCE TO KREG(TV)

Affected Analog Television Station		Analysis of current Record Before Proposal (1990 Census)	Analysis of Current Record After Proposal (1990 Census)
03 KREG(TV), GLENWOOD SPRINGS, CO. LICENSED			
Population within NTSC Grade B contour:		215,640	215,640
Population not affected by terrain losses:		120,311	120,311
• Lost to NTSC interference:		63	706
• Lost to additional interference by DTV:		0	0
Percent loss due to cumulated service reductions:		**0.05%**	**0.58%**
Percent loss change as a result of proposal:	**n/a**	**n/a**	**0.53%**

Prepared by
Lohnes and Culver Washnington, DC
May, 2002

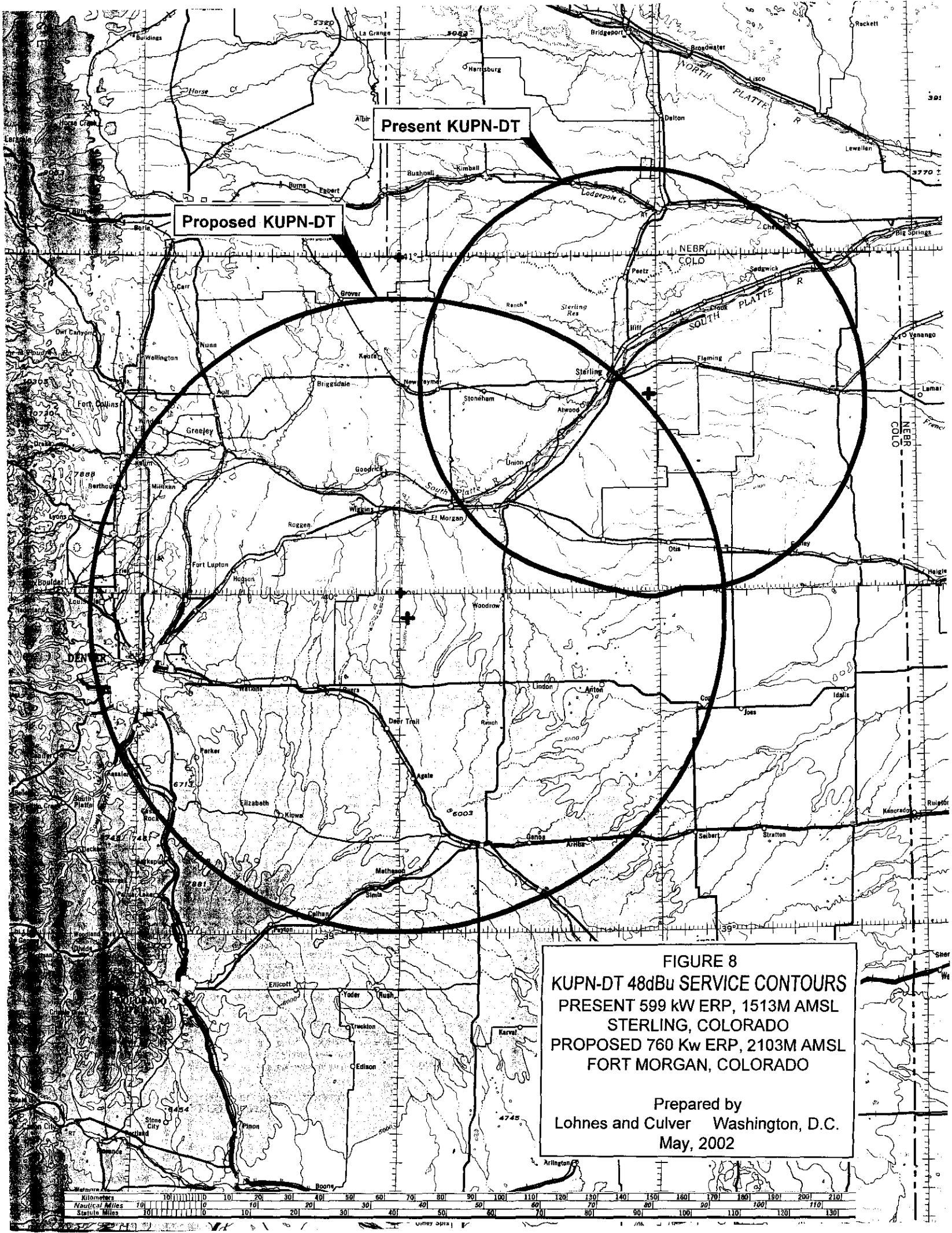

FIGURE 8
KUPN-DT 48dBu SERVICE CONTOURS
PRESENT 599 kW ERP, 1513M AMSL
STERLING, COLORADO
PROPOSED 760 Kw ERP, 2103M AMSL
FORT MORGAN, COLORADO

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Lohnes and Culver Washington, D.C.
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FIGURE 9A
DTV-TO-DTV INTERFERENCE ANALYSIS

Analysis of Interference to Affected Station(s):	Initial Baseline Calculation (1990 Census)	Analysis of Current Record Before Proposal (1990 Census)	Analysis of Current Record After Proposal (1990 Census)
22 KXRM-DT, COLORADO SPRINGS, CO. APPENDIX-B			
Population within Noise Limited Contour:		734,954	734,954
Population not affeted by terrain losses:		607,188	607,188
• Lost to all DTV and analog TV (NTSC) interference:		48,275	48,978
DTV SERVICE:		558,913	558,210
DTV/NTSC baseline population in *Appendix B*:	559,000	559,000	559,000
Percent of baseline population covered by DTV SERVICE:		**99.98%**	**99.86%**
Percent of DTV SERVICE impacted by proposal:	**n/a**	**n/a**	**0.13%**
22 KXRM-DT, COLORADO SPRINGS, CO. CP. BPCDT-991029IC			
Population within Noise Limited Contour:		1,187,556	1,187,556
Population not affeted by terrain losses:		871,877	871,877
• Lost to all DTV and analog TV (NTSC) interference:		260,602	261,103
DTV SERVICE:		611,275	610,774
DTV/NTSC baseline population in *Appendix B*:	559,000	559,000	559,000
Percent of baseline population covered by DTV SERVICE:		**100.00%**	**100.00%**
Percent of DTV SERVICE impacted by proposal:	**n/a**	**n/a**	**0.09%**
24 KRDO-DT, COLORADO SPRINGS, CO. CP. BPCDT-991026CY			
Population within Noise Limited Contour:		1,939,521	1,939,521
Population not affeted by terrain losses:		1,671,203	1,671,203
• Lost to all DTV and analog TV (NTSC) interference:		396,086	412,713
DTV SERVICE:		1,275,117	1,258,490
DTV/NTSC baseline population in *Appendix B*:	1,273,000	1,273,000	1,273,000
Percent of baseline population covered by DTV SERVICE:		**100.00%**	**98.86%**
Percent of DTV SERVICE impacted by proposal:	**n/a**	**n/a**	**1.31%**
23 KREG-DT, GLENWOOD SPRINGS, CO. CP. BPCDT-991029FR			
Population within Noise Limited Contour:		215,645	215,645
Population not affeted by terrain losses:		74,360	74,360
• Lost to all DTV and analog TV (NTSC) interference:		0	34
DTV SERVICE:		74,360	74,326
DTV/NTSC baseline population in Appendix B:	*85,000*	*85,000*	*85,000*
Percent of baseline population covered by DTV SERVICE:		**87.48%**	**87.44%**
Percent of DTV SERVICE impacted by proposal:	**n/a**	**n/a**	**0.04%**

FIGURE 9B
DTV-TO-NTSC INTERFERENCE ANALYSIS

Affected Analog Television Stations	Initial FCC Determination in Appendix B (1990 Census)	Analysis of current Record Before Proposal (1990 Census)	Analysis of Current Record After Proposal (1990 Census)
31 KDRV-TV, DENVER, CO. LICENSED			
Population within NTSC Grade B contour:		2,072,593	2,072,593
Population not affected by terrain losses:		2,047,242	2,047,242
• Lost to NTSC interference:		0	0
• Lost to additional interference by DTV:		3,112	3,153
Percent loss due to cumulated service reductions:	**0.10%**	**0.20%**	**0.20%**
Percent loss change as a result of proposal:	**n/a**	**n/a**	**0.00%**
22 KFCT(TV), FORT COLLINS, CO. LICENSED			
Population within NTSC Grade B contour:		452,796	452,796
Population not affected by terrain losses:		433,646	433,646
• Lost to NTSC interference:		2,056	2,056
• Lost to additional interference by DTV:		7,902	8,742
Percent loss due to cumulated service reductions:	**0.00%**	**1.70%**	**1.90%**
Percent loss change as a result of proposal:	**n/a**	**n/a**	**0.20%**
25 KDEN(TV), LONGMONT, CO. LICENSED			
Population within NTSC Grade B contour:		2,169,834	2,169,834
Population not affected by terrain losses:		2,144,773	2,144,773
• Lost to NTSC interference:		367	367
• Lost to additional interference by DTV:		2,063	3,306
Percent loss due to cumulated service reductions:	**0.10%**	**0.10%**	**0.20%**
Percent loss change as a result of proposal:	**n/a**	**n/a**	**0.10%**

FCC 162
April 2000

Approved by OMB
3060-0919

Federal Communications Commission
Commission Registration System (CORES)
CORES Certification Form

I, Marianne C. Lynch, certify that the FCC Registration Number (FRN) listed below is true and correct to the best of my knowledge, information and belief.

FCC Registration Number (FRN)	0	0	0	4	0	7	8	0	4	4		

ENTITY NAME:

C	H	A	N	N	E	L		2	0		T	V		C	O	M	P	A	N	Y													